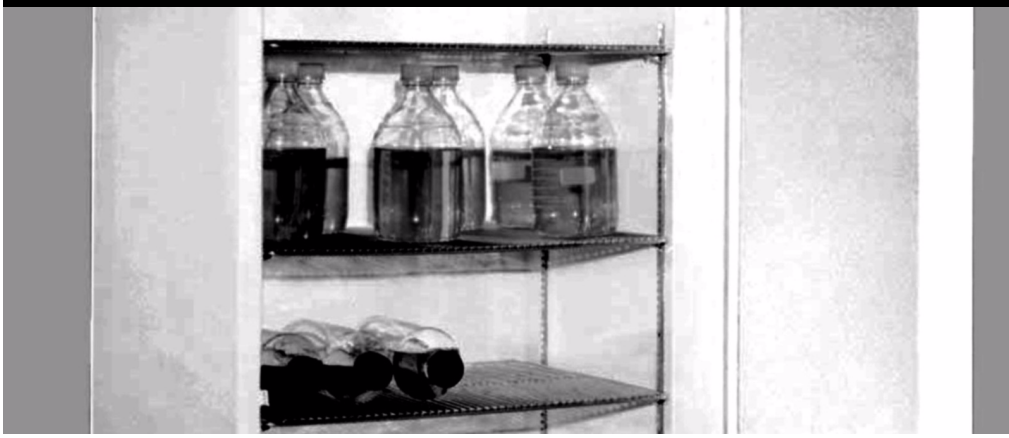
Installation and Operation Manual

Thermo Scientific Jewett®
Blood Bank Refrigerators



Part of Thermo Fisher Scientific

Thermo SCIENTIFIC

© 2010 Thermo Fisher Scientific. All rights reserved.

Table of Contents

1 Introduction . . . 1

2 Safety Precautions . . . 1

3 Unpacking and Inspection . . . 2

4 Installation . . . 2

4.1 Location . . . 2

4.2 Wiring . . . 2

4.3 Leveling . . . 2

4.4 Door Operation . . . 2

4.4.1 Adjustable Hinged Glass Doors (Undercounter Models Only) . . . 2

4.5 Door Seal . . . 3

4.6 Final Checks . . . 3

5 Drawers . . . 3

5.1 Removing the Drawers . . . 3

5.2 Reinstalling the Drawers . . . 3

5.3 Changing Drawer Slide Position . . . 3

5.4 Control Panel Features . . . 4

6 Control Panel . . . 4

6.1 Display Functions . . . 5

6.2 Programming Functions . . . 5

6.3 Service Parameters . . . 5

7 Operation . . . 6

7.1 Start Up . . . 6

7.2 Product Loading Guidelines . . . 6

7.3 Automatic Defrost . . . 6

8 Temperature Control . . . 6

8.1 Setpoint Control . . . 6

8.2 Sensor Bottles . . . 6

9 Alarm Systems 7

9.1 Operating the Alarm 7

9.2 Local and Remote Alarms 7

9.3 Installing a Remote Alarm (Optional) 7

9.4 Alarm Test 7

9.4.1 Theory of Operation 7

9.4.2 Alarm Test Procedure 7

10 Chart Recorders 8

10.1 Set Up and Operation 8

10.2 Power Supply 8

10.3 Changing Chart Paper 8

10.4 Calibration Adjustment 8

11 Cleaning 9

11.1 Cleaning the Drawers and Cabinet Interior 9

11.2 Cleaning the Condenser 9

12 Troubleshooting 10

1 Introduction

Blood bank refrigerators are designed to meet strict AABB, ANRC and FDA requirements for stored product safety.

This manual provides installation and operation instructions for: Undercounter models (4.7 ft^3), Space Saver models (11.5 ft^3) and Upright models (23.3, 29.2 and 51.1 ft^3). Refer to Table 1 to determine the specifications that apply to your unit.

The control system, standard on all models, includes:

- Key-operated power and alarm switch
- Preset temperature setpoint
- Digital temperature display with 0.1ºC resolution
- Graphic temperature display
- Audible and visual power failure indicators
- Alarm silence, ringback, and automatic reset functions
- Pushbutton alarm test

Other standard features include:

- Keyed door locks
- Remote alarm contacts
- CFC-free refrigerant
- CFC-free foamed in-place urethane insulation
- Quiet, hermetically sealed refrigeration compressors

Upright models (23.3 ft^3 and larger) also have: fully extendable stainless steel drawers; a sensor selection button (for upper and lower cabinet temperature readings); and an independent switch for interior cabinet lights.

Seven day chart recorders are standard on all models.

2 Safety Precautions

In this manual and on labels attached to this product, the words WARNING and CAUTION mean the following:

- WARNING: a potentially hazardous situation which, if not avoided, could result in serious injury or death.
- CAUTION: a potentially hazardous situation which, if not avoided, may result in minor or moderate injury or damage to the equipment.

Before installing, using or maintaining this product, please be sure to read this manual and product warning labels carefully. Failure to follow these instructions may cause this product to malfunction, which could result in injury or damage.

Below are important safety precautions that apply to this product:

- Use this product only in the way described in the product literature and in this manual. Before using it, verify that this product is suitable for its intended use.
- Do not modify system components, especially the controller. Use OEM exact replacement equipment or parts. Before use, confirm that the product has not been altered in any way.
- Your unit must be properly grounded in conformity with national and local electrical codes. Never connect the unit to overloaded power sources.
- Disconnect the unit from all power sources before cleaning, troubleshooting, or performing other maintenance on the product or its controls.

Table 1. Blood Bank Refrigerator Specifications

Model	Voltage Code[a]	Amps/ Breaker	Cu. Ft./ Liters	Cabinet	Door	Drawers/ 450ml bags	Dimensions H x F-B x W in. (cm)		Net Prod. Wt. lbs (kg)
							Interior	Exterior	
JBB404	A	6.0/15	4.7/	Undercounter	Single solid	2/48	20 x 20.5 x 20 (50.8 x 52 x 50.8)	34 x 26 x 24 (86.2 x 66 x 61)	200 (91)
	D	6.0/15							
	V, W	6.0/15							
JBB1204	A	9.4/15	11.5/ 326	Space Saver	Single hinged glass	5/165	52.4 x 21.75 x 20 (133.2 x 55.2 x 50.8)	71.9 x 28.75 x 24 (182.6 x 73 x 61)	320 (146)
	D	6.0/15							
	V, W	6.0/15							
JBB2304	A	9.4/15	23.3 659	Upright	Single hinged glass	6/360	58 x 29 x 24 (147.3 x 73.7 x 61.0)	77.5 x 36.2 x 28 (196.9 x 92.0 x 71.1)	425 (193)
	D	6.0/15							
	V, W	6.0/15							
JBB3004	A	9.4/15	29.2/ 826	Upright	Single hinged glass	6/462	58 x 29 x 30 (147.3 x 73.7 x 76.2)	77.5 x 36.2 x 34 (196.9 x 92.0 x 86.4)	500 (227)
	D	6.0/15							
	V, W	6.0/15							
JBB5004	A	15.0/20	51.1/ 1447	Upright	Double hinged glass	12/720	58 x 29 x 52.5 (147.3 x 73.7 x 133.4)	77.5 x 36.2 x 56.5 (196.9 x 92.0 x 143.5)	640 (290)
	D	8.5/15							
	V, W	8.5/15							

[a] A = 115V, 60Hz; D = 208/230V, 60Hz; V = 220V, 50Hz; W = 240V, 50 Hz

3 Unpacking and Inspection

At delivery, examine the exterior for physical damage while the carrier's representative is present. If exterior damage is present, carefully unpack and inspect the unit and all accessories for damage.

If there is no exterior damage, unpack and inspect the equipment within five days of delivery. If you find any damage, keep the packing materials and immediately report the damage to the carrier. ***Do not return goods without written authorization.*** When submitting a claim for shipping damage, request that the carrier inspect the shipping container and equipment.

4 Installation

4.1 Location

Install the unit in a level area free from vibration with a minimum of 6 inches of space on the sides and rear and 12 inches at the top.

Do not position the equipment in direct sunlight or near heating diffusers, radiators, or other sources of heat. The ambient temperature range at the location must be 59 to 90°F (15 to 32°C).

4.2 Wiring

CAUTION! Connect the equipment to a separate, dedicated, power source with the correct voltage. Power fluctuations or incorrect voltage can result in severe damage to the equipment.

DANGER! For personal safety and trouble-free operation, this unit must be properly grounded before it is used. Failure to ground the equipment may cause personal injury or damage to the equipment. Always conform to the National Electrical Code and local codes. Do not connect unit to already overloaded power lines.

Always connect the equipment to a dedicated (separate) circuit. Electrical codes require fuse or circuit breaker protection for branch circuit conductors. Use time delay fuses for #12 AWG circuits.

For all blood bank models, the wiring diagram is attached to the back of the cabinet.

4.3 Leveling

The unit must be level. Rotate the leveling screws, located under the front corners of the unit, until the unit is level. If the floor is seriously out of level, you may need to shim the corners with thin sheets of metal.

Note: *Use thin sheets of metal to level units equipped with optional casters.*

4.4 Door Operation

Standard glass doors for models larger than the undercounter model stay open if opened 90 degrees. Door spring tension cannot be adjusted.

If the self-closing doors do not work properly, make sure the unit is level.

4.4.1 Adjustable Hinged Glass Doors (Undercounter Models Only)

On Undercounter models with hinged glass doors, you can use a regular screwdriver to adjust spring tension and center each door on its frame. The adjustment screws ("torque" for tension and "sag" for door placement) are located on the bottom hinge bracket (shown below in Figure 1).

Hinged glass doors can be propped open with metal braces at the bottom hinges. Open the door 90 degrees or until you feel some resistance. Push the door open past the resistance and the metal braces engage. To close the door, push it toward the unit (past the resistance).

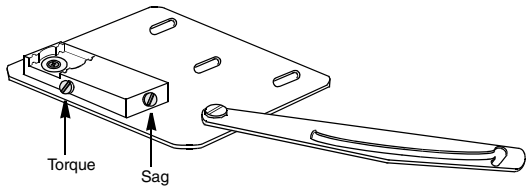


Figure 1. Undercounter Hinge Bracket for Glass Door Adjustments

CAUTION! Do not overtighten the tension as damage to the equipment can result.

WARNING! Disconnect equipment from main power before attempting any maintenance to equipment or its controls.

4.5 Door Seal

To check the door seal, complete the following steps:

1. Open the door.
2. Insert a strip of paper (a couple of inches wide) between the door gasket and the cabinet flange and close the door.
3. Slowly pull the paper strip from the outside. You should feel some resistance.
4. Repeat this test at 4-inch intervals around the door. If the door does not seal properly, you need to either replace the gasket, or adjust the door (see the previous page).

CAUTION! Door seal integrity is critical for blood bank refrigerators. A loose fitting gasket allows moist air to be drawn into the cabinet, resulting in quicker frost buildup on the evaporator coil, longer running time, poor temperature maintenance, and increased operation cost.

The door seals on 12 ft^3 models can be adjusted. To correct a faulty seal on these units, complete the following steps:

1. Open the door completely.
2. Remove the hinge pin cover to expose the door mounting screws. This cover pops off.
3. Loosen the screws and move the door side of the hinge to decrease the clearance between the gasket and the cabinet.
4. Tighten the screws and snap the hinge pin covers on.
5. Recheck the seal.
6. If the door does not seal properly, replace the gasket.

4.6 Final Checks

Before start up, complete the following steps:

1. Make sure that the unit is free of all wood or cardboard shipping materials, both inside and outside.
2. Check the positions of the stainless steel drawers. If you want to adjust the drawer slides in an Upright unit, follow the instructions in Section 5.3.
3. Verify that the unit is connected to a dedicated circuit.

5 Drawers

5.1 Removing the Drawers

To remove the drawers in Upright models (23 ft^3 and larger) complete the following steps (refer to Figure 2):

1. Pull the drawer toward you until the slides are fully extended.
2. Lift the back of the drawer to disengage the mounting tabs from the slots on the slides.

Note: *The drawers fit snugly between the slides. Push the back of the drawer from underneath to remove the drawer.*

3. Raise the back of the drawer almost to a vertical position and disengage the front mounting clips from the slides.

To remove the drawers on Space Saver models, depress the hooks located on both sides of the drawers (about 1/3 of the way back) and slide the drawers up and out.

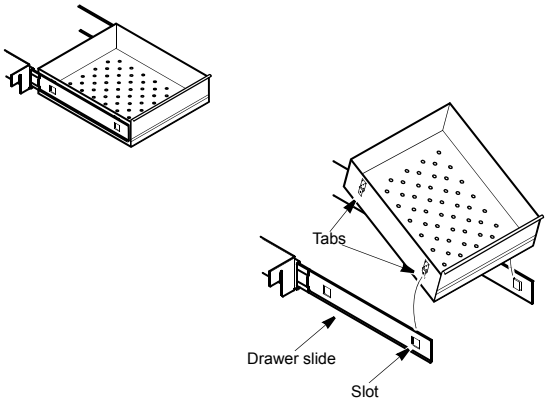


Figure 2. Drawer Removal (Upright Models)

5.2 Reinstalling the Drawers

To reinstall the drawers in Upright models, complete the following steps (refer to Figure 2):

1. Pull both drawer slides toward you until the slides are fully extended.
2. Position the drawer between the slides and insert the front mounting clips into the slots on front of the slides.
3. Push the back of the drawer down between the slides and insert the drawer tabs into the back slots.

Note: *The drawers fit snugly between the slides. Push on the back of the drawer from the inside to insert the drawer tabs completely into the slots. Make sure both drawer tabs are aligned with the slots on the slides before pushing the drawer down between the slides.*

5.3 Changing Drawer Slide Position

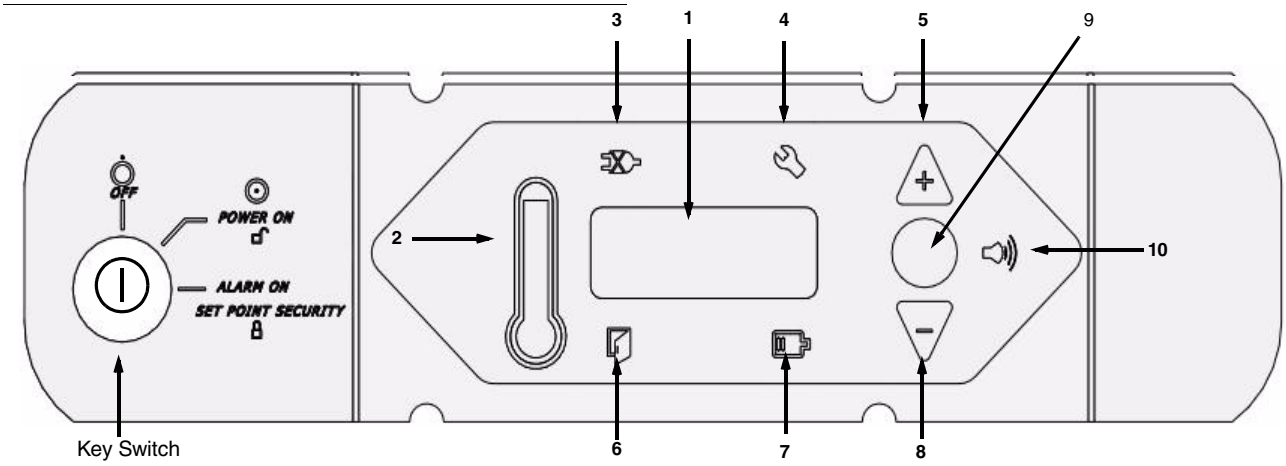
The drawer slides are adjustable. You can position these slides in the vertical slots which are spaced at one-inch intervals.

Drawer slides have a small wire safety clip at the front pilaster which prevents the slides from falling when the drawers are removed. To change the position of the drawer slides, complete the following steps:

1. Locate the safety clip.
2. Slip your fingernail or a small screwdriver under the bottom of the wire clip and pry the clip out toward the inside of the refrigerator.
3. Lift up the slide at the front. The slide is free to move from the front pilaster.
4. The drawer slide must be removed from the rear pilaster at approximately a 45 degree angle toward the center of the cabinet.
5. Pull the slide toward the front of the cabinet.

CAUTION! Drawer slides do *not* require lubrication. Additional lubricant could impede movement of the drawers when the lubricant is cold.

6 Control Panel



6.1 Control Panel Features

The control panel is located on the top right side of your blood bank refrigerator. You can use the three pushbuttons (#5, #8, and #9 in Figure 3) to change the temperature display (#1) or to adjust temperature and alarm setpoints. The thermometer display (#2) provides a quick visual indicator of current cabinet temperature and alarm conditions.

Before starting up your refrigerator, take some time to review the control panel functions:

1. Main temperature display — during normal operation, shows cabinet temperature in degrees Celsius, as measured by the upper sensor inside the cabinet. You can use the buttons to display other values such as setpoints, extreme values, and lower sensor temperature. The number in the main display flashes when the value can be modified.

2. Thermometer — shows cabinet temperature and alarm conditions. There are 10 horizontal bars: 9 are displayed during normal operation, the tenth (top) bar indicates a warm alarm condition. The number of bars illuminated indicates approximate cabinet temperature. Depending on alarm settings, 4 or 5 bars illuminated indicate that the cabinet is at setpoint.

   For example, suppose that the cabinet temperature setpoint is +4ºC and that the warm and cold alarm setpoints are 8ºC and 0ºC. Then the number of bars illuminated indicates cabinet temperature as follows:

bulb only	0ºC (cold alarm)	6 bars	4.8
1 bar	0.8	7 bars	5.6
2 bars	1.6	8 bars	6.4
3 bars	2.4	9 bars	7.2
4 bars	3.2	10 bars	8 (warm alarm)
5 bars	4 (setpoint)		

   When cabinet temperature exceeds the warm alarm setpoint, the top bar of the thermometer flashes. When temperature is lower than the cold alarm setpoint, the bulb flashes.

   When you are in programming mode (described in Table 2) the thermometer shows the setpoint value you are changing.

3. Power failure — illuminated when the main power supply is interrupted. In this case the audible alarm also sounds.

4. Service required —illuminated when the controller is in service programming mode or when simulated warm or cold alarm conditions are failing to occur during an alarm test.

5. Increase — pushbutton used to increase setpoint values in programming mode and for various display functions.

6. Door ajar — illuminated when the refrigerator door is open and the alarm is activated (key switch turned to the alarm position). (This feature is not available for 45 ft^3 sliding glass door models.)

7. Battery low — illuminated when the backup battery is low.

8. Decrease — pushbutton used to decrease setpoint values in programming mode and for various display functions.

9. Scan — pushbutton used to change the main display and for various other functions.

10. Audible alarm — illuminates during warm and cold alarm conditions.

For full descriptions of display, programming, and service functions, refer to Tables 2, 3, and 4 on page 5.

6.2 Display Functions

Table 2. Control Panel Display Functions

Function	Meaning	Sequence	Display
Normal operation	Default display while refrigerator is running	—	Temperature display and thermometer show cabinet temperature.
Cold excursion	Show coldest cabinet temperature since last startup or reset	Press ▽	Display shows cold excursion while button is pressed.
Warm excursion	Show warmest cabinet temperature since last startup or reset	Press △	Display shows warm excursion while button is pressed.
Mute	Silence audible alarm	Press Scan	Display and thermometer show cabinet temperature, alarm icon continues to flash.
Reset	Return to default display after excursion or alarm condition	Press △ and ▽ simultaneously, hold for five seconds	Excursion values are reset; temperature display shows cabinet temperature.
Alarm test	Test by simulating warm alarm conditions; key switch must be in alarm mode	Press △ and Scan simultaneously	Display and thermometer show simulated cabinet temperature, alarms flash and sound as appropriate. Alarms clear when test is completed.
Lower sensor	Display lower cabinet temperature	Press ▽ and Scan simultaneously and hold	Display shows lower cabinet temperature while buttons are held, returns to upper cabinet temperature when buttons are released. ERR is displayed if no lower sensor probe is detected.

6.3 Programming Functions

You can enter programming mode by pressing ▢ and holding for 5 seconds. Pressing ▢ repeatedly scrolls through the available setpoint functions: cold alarm and warm alarm.

Table 3. Setpoint Programming Functions

Function	Programming Sequence
Adjust cold alarm setpoint	Enter programming mode by pressing Mute and holding for 5 seconds. On release, the current cold alarm setpoint value flashes in the temperature display; use ▽ and △ to adjust it. The display automatically returns to normal operating mode 30 seconds after the last key entry or after scrolling through both available functions.
Adjust warm alarm setpoint	Enter programming mode and press Scan repeatedly until the top of the thermometer is illuminated. The current warm alarm setpoint value then flashes in the temperature display; use ▽ and △ to adjust it. The display automatically returns to normal operating mode 30 seconds after the last key entry or after scrolling through both available functions.

6.4 Service Parameters

When the key switch is *not* turned to third (alarm) position, you can access service parameters by entering programming mode and pressing Scan for an additional 5 seconds. On release of the button, the display will go blank, then display "SEr" with the service wrench icon illuminated. Then the *firmware checksum* (read-only) will be displayed for about 4 seconds. Pressing Scan repeatedly scrolls through the available service functions. While you are in service mode, the wrench icon is illuminated. For any flashing parameter you can use ▽ and △ to adjust the value.

⚠ **CAUTION!** Resetting any of the following parameter values could adversely affect the performance of your blood bank refrigerator. These settings very rarely need to be changed for normal +4ºC operation. Be sure to call Technical Service before making any adjustments to service parameter values.

Table 4. Service Parameters

Parameter	Notes	Parameter	Notes
1. Offset	Center air temperature calibration. Default value is 0.	6. Defrost Termination	Temperature at evaporator at which defrost cycle terminates; default value is 4ºC.
2. Cut On	Cabinet temperature at which compressor starts to cool down to setpoint. Default value is 6ºC.	7. Short Cycle Delay	Range 0 to 15 minutes; default value is 0.
3. Differential	Cut On – differential = temperature at which compressor stops after achieving cabinet temperature setpoint. Default value is 3.	8. Control Probe Temperature	Display only.
4. Defrost Interval	Range 1 to 12 hours; default value is 1.	9. Defrost Probe Temperature	Display only.
5. Defrost Duration	Range 5 to 30 minutes; default value is 15.		

7 Operation

7.1 Start Up

To start up the refrigerator, complete the following steps:

1. Plug in the power cord.
2. Insert the key in the switch and turn the power on.The display will show the actual cabinet temperature.
3. Rotate the power switch to the ALARM ON position when the temperature drops below the warm alarm setpoint.
4. Allow the unit to reach operating temperature before loading it with any product. To stabilize the temperature profile, a 24-hour waiting period is recommended.
5. After the unit has pulled down to the desired operating temperature, turn the three position key switch one turn further clockwise to the Alarm On position.
6. If you have a remote alarm, hook it up at this point (refer to Section 9.3 on page 7).
7. Whether you have a built-in alarm or a customer-installed remote alarm, you should test it following the instructions in Section 9.4 on page 7. Alarm setpoints are factory pre-set for 5.5°C (warm) and 1.5°C (cold).

7.2 Product Loading Guidelines

When loading your blood bank refrigerator, take care to observe the following guidelines:

- Never load the blood bank beyond capacity. Table 1 on page 1 shows the number of 450ml bags that can safely be stored in your unit.
- Distribute the load as evenly as possible. Temperature uniformity depends on air circulation, which could be impeded if drawers are overfilled, particularly at the top of the cabinet.
- For critical applications such as blood storage, be sure that the alarm systems are working and active before you load any product.

7.3 Automatic Defrost

The defrosting process on all models is primarily accomplished by air circulated during off-cycle periods.

Under normal conditions, the temperature warm-up during defrost is virtually unnoticeable. However, an occasional 2°C warm-up is possible if usage is heavy and ambient conditions are extreme.

8 Temperature Control

8.1 Setpoint Control

Your individual unit has been adjusted and factory tested to maintain a +4°C cabinet temperature. For most blood bank applications, you will not need to change the temperature setpoint.

Cabinet temperature setpoint is a computed value based on the service parameters Cut On and Differential. To adjust the setpoint:

1. Be sure that the key switch is *not* turned to the third (alarm) position. In order to protect the contents of the blood bank, access to service parameters is disabled when the unit is in alarm mode.
2. Access the service parameters as shown in Table 4 on page 5.
3. Adjust the values of Cut On and Differential as needed.

8.2 Sensor Bottles

Cabinet temperature is measured by probes inserted in sensor bottles. The bottles contain equal portions of glycerine and water to simulate blood samples. Keep the sensor bottles completely full up to the top of the bottle.

Space Saver models have one factory-installed sensor bottle. In Upright models (23 ft^3 and larger) there are two sensor bottles, positioned as shown in Figure 4.

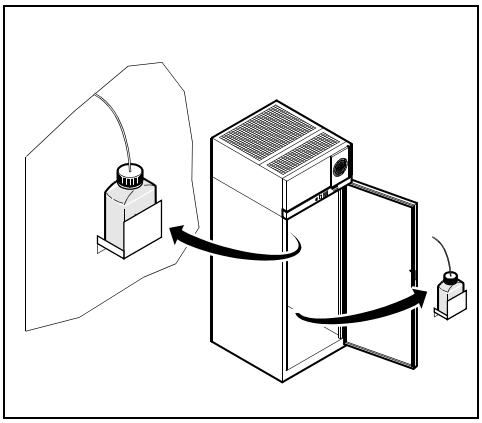


Figure 4. Sensor Bottles (Upright Models)

The default sensor reading for Upright units is the bottle at the top of the cabinet. You can check the temperature in the lower sensor bottle by pressing and holding ∇ and Scan simultaneously (refer to Figure 3 on page 4). When you release the buttons, the temperature display returns to the upper sensor reading.

9 Alarm Systems

9.1 Operating the Alarm

The alarm system is designed to provide visual and audible warning signals for both power failure and rise in temperature. The alarm is equipped with a battery backup.

The factory default warm alarm setpoint is 5.5ºC; the default cold alarm setpoint is 1.5ºC.

The alarm system is activated only when the key switch is turned to the Alarm On position. The audible warning signal sounds when there is a power failure or temperature alarm condition, or when the door is ajar for more than 3 minutes.

The Mute function (pressing the Scan button) allows you to turn off the audio warning without turning off the visual indicators.

To turn off and reset flashing visual alarms, press △ and ▽ simultaneously.

There is also a ringback function after approximately 6 minutes if any alarm condition remains active.

9.2 Local and Remote Alarms

Blood bank units can have either a factory-installed local alarm or an optional user-installed remote alarm. Operating and testing procedures are the same for both types of alarm.

The maximum distance between a blood bank and a remote alarm depends on the wire gauge used. Refer to Table 5 below.

Table 5. Wire Gauges and Distance to Remote Alarm

Wire Gauge	Total Wire Length (feet)	Distance to Alarm 1/2 Wire Length (feet)
20	530	265
18	840	420
16	1,330	665
14	2,120	1,060
12	3,370	1,685

9.3 Installing a Remote Alarm (Optional)

Remote alarm terminals are located at the rear of the machine compartment. The terminals are: Common, Open on Fail (Normally Closed), and Close on Fail (Normally Open).

1. The remote alarm system has two keyhole slots on the back to hang the alarm system on the wall. Insert two screws, no longer than a #12 truss-head type and spaced two inches apart, into a wall and mount the alarm.
2. Make the following connections:
   a. Connect the common terminal on the cabinet switch to the purple wire on the alarm.
   b. Connect the normally closed terminal on the cabinet to the black (“open on fail”) wire on the alarm. This connection gives an alarm when the switch contacts open.
3. Plug the alarm system service cord into an electrical outlet. This alarm is designed for 115V/60 Hz, 115V/50 Hz, or 100V/50 Hz operation.

Note: *If you want the alarm signal to sound when the switch contacts **close**, connect the normally open terminal on the cabinet to the red/white (“close on fail”) wire on the alarm. The purple and red/white wires must be tied together in this application.*

The wiring diagram is attached to the inside of the alarm back cover.

9.4 Alarm Test

Note: *It is important to test your alarm system after any maintenance operation or temperature control adjustment.*

9.4.1 Theory of Operation

This test procedure applies to both factory-installed built-in alarms and optional field-installed remote alarms.

During the alarm test, the temperature sensor is artificially heated and cooled by a tiny, built-in thermoelectric heating and cooling unit which simulates both warm and cold conditions. The electronic control module notes the sensor temperature changes and the control panel displays these changes.

While this alarm testing procedure is very accurate and reliable, the temperature of the refrigerated space does not change during the alarm test.

9.4.2 Alarm Test Procedure

Note: *This test automatically advances through all steps and stops.*

1. Verify that the key position is in the alarm mode, and that the current warm and cold alarm setpoints are within normal ranges (the warm and cold simulations may not work if the setpoints are set to extreme values).
2. To start the alarm test, press △ and Scan simultaneously. During the test the main display and thermometer bulb will indicate simulated (not actual) cabinet temperature.
3. When simulated temperature exceeds the warm alarm setpoint, the alarm sounds and the alarm icon on the control panel illuminates (#10 in Figure 3 on page 4).
4. The temperature display begins to drop. After a few seconds, the temperature in the display is back in the operating range.
5. The alarm stops. The temperature on the display drops until the cold alarm sounds.
6. The test is now complete but the alarm continues to sound until the temperature on the display is back in the operating range.

If the simulated alarm conditions do not occur during the first 5 minutes of the alarm test, the service (wrench) icon illuminates and the test is terminated. You can also terminate the test immediately by turning the key switch to the second (non-alarm) position. When during the alarm test, the temperature display does not change or the service icon illuminates, check the sensor connections.

After an alarm test has terminated, there is a 10-minute delay before the test can be run again.

10 Chart Recorders

Panel-mounted six inch recorders are standard and factory-installed on all models except for undercounter models, for which free-standing recorders are available as options.

Recorder operation begins when the system is powered on.

10.1 Set Up and Operation

To prepare the recorder to function properly, complete the following steps:

1. Open the recorder door to access the recorder.
2. Connect the nine volt DC battery located at the recorder's upper right corner. This battery provides back-up power.
3. Install clean chart paper (refer to Section 10.3 below).
4. Remove the plastic cap from the pen stylus and close the recorder door.

Note: *The recorder may not respond until the system reaches temperatures within the recorder's range.*

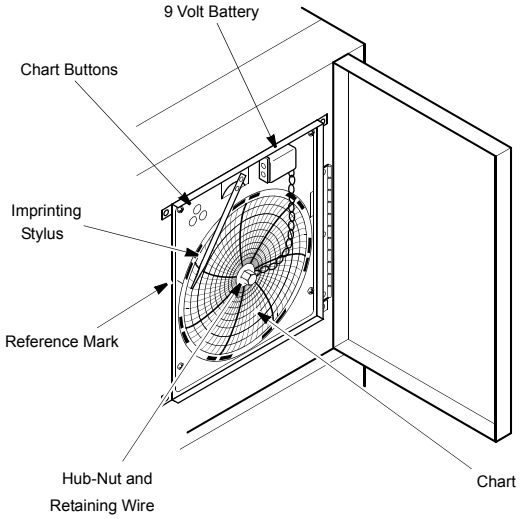


Figure 5. Six Inch Chart Recorder

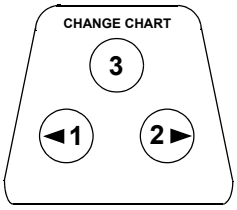


Figure 6. Chart Buttons

10.2 Power Supply

The recorder normally uses AC power when the system is operating. If AC power fails, the LED indicator flashes to alert you to a power failure. The recorder continues sensing cabinet temperature and the chart continues turning for approximately 24 hours with back-up power provided by the nine-volt battery.

The LED indicator glows continuously when main power is functioning and the battery is charged.

When the battery is low, the LED flashes to indicate that the battery needs to be changed.

10.3 Changing Chart Paper

To change the chart paper, complete the following steps:

1. Locate the pressure sensitive buttons at the front, upper left of the recorder panel.
2. Press and hold the change chart button for one second. The pen will move off the scale.
3. Unscrew the center nut, remove the old chart paper, and install new chart paper. Carefully align the day and time with the reference mark on the recorder panel (a small groove on the left side of the panel, shown in Figure 5).
4. Replace the center nut and hand tighten. Press the change chart button again to resume temperature recording.

10.4 Calibration Adjustment

This recorder has been accurately calibrated at the factory and retains calibration even during power interruptions. If required, however, adjustments can be made as follows:

1. Run the unit continuously at the control setpoint temperature. Continue steady operation for at least two hours to provide adequate time for recorder response.
2. Measure cabinet center solution temperature with a calibrated temperature monitor. (Solution temperature is measured inside the sensor bottles — see Section 8.2.)
3. Compare the recorder temperature to the solution temperature. If necessary, adjust recorder by pressing the left (#1) and right (#2) chart buttons.

Note: *The stylus does not begin to move until the button is held for five seconds.*

11 Cleaning

11.1 Cleaning the Drawers and Cabinet Interior

To clean the drawers and cabinet interior, remove the drawers following the instructions in Section 5. Use a solution of water and a mild detergent. Rinse the drawers and wipe them dry with a soft cloth.

11.2 Cleaning the Condenser

WARNING! Disconnect equipment from main power before attempting any maintenance to equipment or its controls.

CAUTION! Condensers should be cleaned at least every six months. In heavy traffic areas, condensers load with dirt more quickly. Failure to keep the condenser clean can result in equipment warm-up or erratic temperatures.

CAUTION! Never clean near condensers with your fingers. Some surfaces are sharp.

Periodically check the condenser to make sure that it is clean.

In all models, the condenser is located in the top machine compartment. To clean the condenser:

1. Disconnect the power.
2. Remove the top grill.
3. Use a vacuum cleaner with hose and brush attachments to clean the front face of the finned surface.
4. Clean up any loose dust and replace the grill.
5. Reconnect the power.

12 Troubleshooting

WARNING! Troubleshooting procedures involve working with high voltages which can cause injury or death. Troubleshooting should only be performed by trained personnel.

This section is a guide to troubleshooting equipment problems.

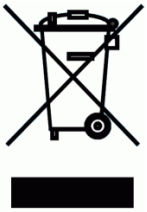
Table 6. Troubleshooting Procedures

Problem	Cause	Solution
Unit does not operate or Power Failure Indicator is on.	Power supply	1. Check that the cord is securely plugged in. 2. Plug another appliance into the outlet to see if it is live. 3. Test the voltage and verify that it is correct for your unit (refer to Table 1 on page 1). 4. If the outlet is dead, check the circuit breaker or fuses.
Temperature fluctuates.	Cold control	Make sure that the cold control is set correctly. Refer to Section 8 on page 6.
	Condenser	Make sure the condenser is clean. Refer to Section 11.2 on page 9.
	Other causes	If the cold control is set correctly, the condenser is clean, but temperature continues to fluctuate, call an authorized service representative.
Unit warms up.	Door is open	Make sure the door is completely closed.
	Door seal	Check the door seal, following instructions in Section 4.5 on page 3.
	Warm product recently loaded in unit	Allow ample time to recover from loading warm product.
	Power supply	Check for proper voltage to the unit. If there is no voltage to the unit, call an electrician.
	Compressor	1. If the compressor is not running and the power failure alarm light is on, have an electrician check for proper voltage to the unit. 2. If the compressor is not running and the power failure alarm light is off, call the technical support hot line. 3. If the compressor is running, open the door and look through the slotted air intake in the bottom of the evaporator cover to see if icing is present on the evaporator. If icing is present and there is no air flow behind evaporator, call technical service for assistance. The evaporator fans may be inoperative. 4. If the compressor is running and there is airflow behind the evaporator, contact an authorized service provider or call the technical support hot line for assistance.

WEEE Compliance

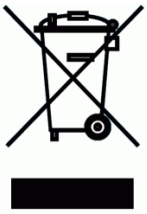
WEEE Compliance. This product is required to comply with the European Union's Waste Electrical & Electronic Equipment (WEEE) Directive 2002/96EC. It is marked with the following symbol. Thermo Fisher Scientific has contracted with one or more recycling/disposal companies in each EU Member State, and this product should be disposed of or recycled through them. Further information on our compliance with these Directives, the recyclers in your country, and information on Thermo Scientific products which may assist the detection of substances subject to the RoHS Directive are available at **www.thermo.com/**

Great Britain



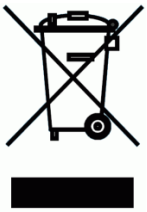
WEEE Konformittät. Dieses Produkt muss die EU Waste Electrical & Electronic Equipment (WEEE) Richtlinie 2002/96EC erfüllen. Das Produkt ist durch folgendes Symbol gekennzeichnet. Thermo Fisher Scientific hat Vereinbarungen getroffen mit Verwertungs-/Entsorgungsanlagen in allen EU-Mitgliederstaaten und dieses Produkt muss durch diese Firmen widerverwetet oder entsorgt werden. Mehr Informationen über die Einhaltung dieser Anweisungen durch Thermo Scientific, dieVerwerter und Hinweise die Ihnen nützlich sein können, die Thermo Fisher Scientific Produkte zu identizfizieren, die unter diese RoHS. Anweisungfallen, finden Sie unter **www.thermo.com/**

Deutschland



Conformità WEEE. Questo prodotto deve rispondere alla direttiva dell' Unione Europea 2002/96EC in merito ai Rifiuti degli Apparecchi Elettrici ed Elettronici (WEEE). È marcato col seguente simbolo.Thermo Fischer Scientific ha stipulato contratti con una o diverse società di riciclaggio/smaltimento in ognuno degli Stati Membri Europei. Questo prodotto verrà smaltito o riciclato tramite queste medesime. Ulteriori informazioni sulla conformità di Thermo Fisher Scientific con queste Direttive, l'elenco delle ditte di riciclaggio nel Vostro paese e informazioni sui prodotti Thermo Scientific che possono essere utili alla rilevazione di sostanze soggette alla Direttiva RoHS sono disponibili sul sito **www.thermo.com**/

Italia



Conformité WEEE. Ce produit doit être conforme à la directive euro-péenne (2002/96EC) des Déchets d'Equipements Electriques et Electroniques (DEEE). Il est marqué par le symbole suivant. Thermo Fisher Scientific s'est associé avec une ou plusieurs compagnies de recyclage dans chaque état membre de l'union européenne et ce produit devraitêtre collecté ou recyclé par celles-ci. Davantage d'informations sur laconformité de Thermo Fisher Scientific à ces directives, les recycleurs dans votre pays et les informations sur les produits Thermo Fisher Scientific qui peuvent aider le détection des substances sujettes à la directive RoHS sont disponibles sur www.thermo.com/

France

Important

For your future reference and when contacting the factory, please have the following information readily available:

Model Number: _____

Serial Number: _____

Date Purchased: _____

The above information can be found on the dataplate attached to the equipment. If available, please provide the date purchased, the source of purchase (manufacturer or specific agent/rep organization), and purchase order number.

IF YOU NEED ASSISTANCE:

SALES DIVISION

Phone: 1-866-984-3766 (866-9-THERMO)

LABORATORY PARTS and SERVICE

Phone: 1-800-438-4851

TECHNICAL SUPPORT

Phone: 1-800-438-4851

Thermo Fisher Scientific Inc.

275 Aiken Road
Asheville, NC 28804
United States

www.thermofisher.com

Thermo
SCIENTIFIC

34830H54 Rev. A